

**UNITED STATES AIR FORCE
IERA**

**Update AF-EMIS for Hazardous
Material Data Entry, McConnell Air
Force Base, Kansas**

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August 1999

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ACRONYM AND ABBREVIATION LIST

ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
AF-EMIS	Air Force Environmental Management Information System
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AMC	Air Mobility Command
Avg.	Average
BE	Bioenvironmental Engineering
BEI	Biological Exposure Index
BEF	Bioenvironmental Engineering Flight
BESWPID	Bioenvironmental Engineering Services Workplace Identification Number
CAA	Clean Air Act
CAGE	Commercial and Government Entity
CAS	Chemical Abstract Service
CE	Civil Engineering
CF	Cubic Feet
Cmd.	Command
Conc.	Concentration
COR	Contractor Officer Representative
CSA	Chemical Staging Area
CSA ID	Chemical Staging Area Identification
CY	Cylinder
DESCIM	Defense Environmental Security Corporate Information Management
DOT	Department of Transportation
°F	Degree Fahrenheit
EHS	Environmental Health and Safety
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
g/l	Grams per liter
GOCESS	Government Operated Civil Engineering Supply Store
HAP	Hazardous Air Pollutant
HAZMAT	Hazardous Material
HAZMART	Hazardous Material Pharmacy
Hg	Mercury
HMIS	Hazardous Material Information System
HM POC	Hazardous Material Point of Contact
HW POC	Hazardous Waste Point of Contact
IEX	Issue Exception
Ins.	Installation

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ACRONYM AND ABBREVIATION LIST (continued)

LB	Pounds
lbs/gal	Pounds per gallon
LG	Logistics Group
LPN	Local Purchase Number
Max.	Maximum
mg/m ³	Milligrams per cubic meter
Min.	Minimum
mm	Millimeters
MSDS	Material Safety Data Sheet
N/A	Not applicable
NIOSH	National Institute for Occupational Safety and Health
No.	Number
NSN	National Stock Number
ODC	Ozone Depleting Chemicals
Ofc.	Office
Org.	Organization
PEL	Permissible Exposure Limit
PES	Pacific Environmental Services, Inc.
Pkg.	Packaging
POC	Point of Contact
PPE	Personal Protective Equipment
ppb	Parts per billion
ppm	Parts per million
Qty.	Quantity
RCRA	Resource Conservation and Recovery Act
RMP	Risk Management Plan
SE	Safety or Chief of Safety
Seq.	Sequential
SOS	Sources of Supply
STEL	Short-Term Exposure Limit
TLV	Threshold Limit Value
TRI	Toxic Release Inventory
UEC	Unit Environmental Coordinator
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

1.1 BACKGROUND

Pacific Environmental Services, Inc. (PES) was contracted under Air Force Contract F41624-95-D-9017, Order 48, to enter and validate data in the Air Force Environmental Management Information System (AF-EMIS) at Hazardous Material Pharmacies at Charleston, Grand Forks, MacDill, McChord, McConnell, McGuire, and Travis Air Force Bases (AFBs). Air Force Instruction (AFI) 32-7086 Hazardous Materials Management, 01 August 1997, requires that bases collect and maintain hazardous material (HAZMAT) data on standardized automated data processing equipment through a Defense Environmental Security Corporate Information Management (DESCIM) program, or a DESCIM-approved interim program. Presently, AF-EMIS is the DESCIM-approved interim program for the Air Mobility Command (AMC). While AF-EMIS is installed at each of the seven AMC bases addressed by this Order, presently its full capabilities cannot be utilized because key data has not been entered into the system. The objective of Order 48 was to correct this deficiency by contracting PES to enter and validate the needed data.

AF-EMIS was developed to provide HAZMAT data to the functional organizations responsible for execution of the HAZMAT Management Process: i.e., Civil Engineering (CE), Bioenvironmental Engineering (BE), Safety (SE), and the Logistics Group (LG). These organizations shall be referred to hereafter as AF-EMIS stakeholders. The HAZMAT data are needed by the organizations to meet their HAZMAT-related reporting requirements; assess pollution prevention opportunities; measure the success in minimizing HAZMAT use; and protect the environmental, safety, and health conditions of workers and the community. Because some of the data fields have not been populated, AF-EMIS cannot be fully utilized for these purposes at the seven bases addressed by this Order.

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Furthermore, not all sources of supply (SOS) currently have connectivity to AF-EMIS or have arrangements with another SOS to make the necessary entries into the tracking system, as required by AMC Supplement I to AFI 32-7086.

PES is to determine the status of the AF-EMIS at the seven bases and to populate the tracking system to allow CE, BE, SE, and LG to satisfy their HAZMAT-related data requirements. In performing this work, PES is to enter data from other SOS, as provided and directed by each base. Data entry for the second of the seven bases (McConnell AFB) was completed 7 May 1999. This report documents the results of the McConnell AFB effort.

PES determined the initial status of AF-EMIS through a telephone conversation with the Base project point of contact (POC), meeting with the AF-EMIS POC, and conducting a Kick-off Meeting. First, PES conversed by telephone with the Base project point of contact (POC) on 8 January 1999 to establish lines of communication with key AF-EMIS stakeholders, partially determine the status of AF-EMIS, and to schedule a meeting with the AF-EMIS POC. This meeting, held on 2 February 1999 at the Air Force Environmental Training Symposium in St. Louis, allowed for further discussions of the initial status of AF-EMIS with the AF-EMIS POC.

PES conducted a base-specific Kick-off Meeting at McConnell AFB on 8 March 1999 to further determine the initial status of AF-EMIS data completeness and quality. In addition, the availability of information and resources to complete data input/validation was discussed with respect to all SOS. The initial AF-EMIS status is summarized in Section 1.3.

Data elements to be entered or verified were established during the base Kick-off Meeting, which was attended, among others, by representatives from CE, BE, LG and SE. A list of the AF-EMIS Materials Module data fields was distributed to

each of the Kick-off Meeting attendees. The list also contained a brief description of each data field and the potential sources of data for each data field. This list was discussed in detail during the meeting to establish the data elements to be entered or verified by PES. The data fields that the various Base organizations wanted populated/updated are identified in Section 1.2.

Data entry/validation was conducted at McConnell AFB by a two-person PES team from 9 March 1999 to 7 May 1999. PES' data entry/validation efforts are presented in Sections 2 through 7 of this report.

1.2 AF-EMIS DATA FIELDS TO BE POPULATED/UPDATED

The hazardous material data resides in the "Materials Module" in the AF-EMIS program. This module consists of the following six types of records: National Stock Number (NSN); Shop; Authorization; Commercial and Government Entity (CAGE), which contains information from the MSDS; Chemical Abstract Service (CAS); and Manufacturer. These records contain the following information:

This record:	Stores information on:
NSN	Hazardous material and waste profiles identified by a National Stock Number or other identifying stock number, such as Local Purchase Number (LPN).
Shop	Organizations and work areas where hazardous material is used and waste is accumulated.
Authorization	Authorizations for shops to use hazardous material.
CAGE (MSDS)	MSDS information on the hazardous material and waste profiles.
CAS	Information on the chemicals contained in the hazardous material or hazardous waste streams.
Manufacturer	Manufacturers and vendors that supply hazardous material.

These records were presented to the AF-EMIS stakeholders as the data AF-EMIS Materials Module data fields list. The AF-EMIS stakeholders used this list to identify the data fields to be populated/updated by PES.

Data fields that the Base AF-EMIS stakeholders wanted populated for the six record types are listed in Table 1.1. Those data fields appearing in bold for each record are the mandatory data that must be entered in order for the AF-EMIS program to create that record. For example, AF-EMIS will not create a NSN record if the NSN, Components in NSN, Noun, Supply, or Shelf Life fields are not populated.

1.3 INITIAL AF-EMIS STATUS

A limited assessment of the status of the data already entered into the AF-EMIS system before PES arrived onsite was determined from discussions with the Base project POC on 8 January 1999, the AF-EMIS POC on 2 February 1999, and with Base AF-EMIS Stakeholders during the Base-specific Kick-off Meeting. PES also perused the database master reports for this purpose, however, only through entering and validating the data was PES able to develop a full understanding of the database condition.

There were 2,568 valid hardcopy Chemical/Hazardous Material Request/Authorizations (Form 3952s), on file at the Base HAZMART. Most of these authorizations were entered into AF-EMIS by the LG prior to PES' data entry activities; however, not all of the data fields were populated. Typically, the only AF-EMIS data fields populated for the authorization record by LG personnel were the mandatory ones for adding a record to the database. In addition, PES found approximately 100 expired and/or invalid authorizations that were listed in AF-EMIS as active authorizations during its data entry activities. These authorizations were made inactive.

Table 1.1 AF-EMIS Data Fields that McConnell AFB Organizations Wanted Populated

Records	Data Field
NSN	NSN Components in NSN Noun Status Break NSN Break Qty Size Unit Pkg. Supply Seq. Tracking Type Material Aerosol Outside Container VOC % Min. (automatically calculated) VOC % Max. (automatically calculated) Health Review IEX Code Physical Hazard Shelf Life
Shop	Process Code and Description
Authorization	NSN Shop Code Status Process New Process ODC (system generated) ODC Application Draw Amount Draw Frequency Reset Justification – Weapon System Justification – Justification Type Justification – Justification Justification – Technical Order Justification – Page Number Justification – Paragraph Number

Table 1-1 (Continued)	
Records	Data Field
Authorization (continued)	Justification – Date Justification – Revision Justification – Remarks How Used Disposal Remarks – Disposal Date Next Action Next Action Health Review – PPE
CAGE (MSDS)	NSN CAGE CAGE Status CAGE Version CAGE Component No. Part No. or Trade Name DOT Shipping Name MSDS Date Health Review Code Health Hazard Physical Hazard Ounces Type pH Type, Min., and Max. VOC with Units Specific Gravity Density Vapor Pressure with Units Constituents – CAS Constituents – Chemical Name Constituents – Amount Min. and Max. Constituents – Concentration Units Constituents – Percent Weight or Volume Constituents – Chemical Form Constituents – Chemical State

Table 1.1 (Concluded)	
Records	Data Field
CAS	None
Manufacturer	CAGE Status Distributor Company Name Address City County State Country Zip Phone Fax

With respect to NSN records, approximately 1,400 NSNs and LPNs were already in the AF-EMIS database when PES initiated its data entry activities; however, only AF-EMIS-mandatory (for record creation) data fields were typically populated correctly. Because the AF-EMIS software uses multiple NSNs or LPNs for the same hazardous material to differentiate container type/size, the 1,400 NSNs and LPNs represent a somewhat smaller number of different HAZMATs.

While most of the NSN records had at least one associated CAGE (MSDS) record, many had multiple CAGE records. This posed an unmanageable quantity of data entry/validation to be performed (>5,000 CAGE records). To reduce the data entry effort to a more manageable level, mutual agreement was reached between HAZMART personnel and PES to limit the CAGE record(s) for populating/updating to those associated with HAZMAT(s) that was (were) in the electronic inventory in the AF-EMIS Staging Area Module and those that had hard copy MSDSs attached to the Form 3952. If no HAZMAT with the NSN/LPN were in inventory and if no hard copy MSDS were attached to the Form 3952, the most recent MSDS based on the MSDS date listed in the Hazardous Material Information System (HMIS) database. PES found that the number of CAGE records populated/validated to be approximately 1.3 times the number of different NSNs and LPNs authorized for shop use. CAGE records that were already in AF-EMIS before PES began data entry, but no longer active (i.e., the associated HAZMAT was not in inventory or the record did not reflect the latest MSDS) were assigned proper sizes (Ounces and Type) and inactivated. Additional details on this subject are presented in Section 6.

Another issue regarding CAGE records relates to the incorrect population of the "CAGE Version" fields. When a new version of a MSDS is obtained for a HAZMAT used at the Base, a new CAGE record should be created utilizing the same CAGE but changing the "CAGE Version" to the next letter value (i.e., old

version "B", new version "C"). The CAGE records in AF-EMIS, when PES first reviewed the data, did not reflect the use of this procedure; the "CAGE Component No." was increased instead. The CAGE Component No. is designed for multi-part kits, such as a two-part epoxy. This incorrect practice resulted in CAGE records with multiple components listed for a single component material. These invalid CAGE records were assigned near zero sizes (Ounces and Type) and inactivated. Based on discussions with personnel at the AF-EMIS Help Desk, the new AF-EMIS, Version 6.0 due for August 1999 release, will not allow the number of CAGE components to exceed the Components in NSN entered in the NSN records. For additional details, refer to Section 6.

About one half of the final number of Manufacturer records required updating to some degree. Most updates were minor such as changes in Office Location or area codes for phone/fax numbers.

PES did not update CAS records because they would be updated with the new AF-EMIS Version 6.0 due to be released in August 1999. Version 6.0 will contain updated CAS records, including some new fields. Therefore, any updates that PES made to the current version of AF-EMIS, would be overwritten by the new CAS records associated with AF-EMIS Version 6.0.

PES entered or validated only the Process Code and Description data field of the Shop records. At the Base-specific Kick-off Meeting, PES was told that Base personnel have input all data fields that the Base AF-EMIS stakeholders wanted populated. The process code and description data field requires routine updating any time the process for an authorized material is revised. PES added approximately 250 processes to the Shop records.

1.4

OVERVIEW OF DATA ENTRY/VALIDATION PROCEDURES

The population of the six hazardous material records must be performed in the following order: Shop, NSN, Manufacturer, CAS, CAGE, and Authorization. Procedures used by PES for each record are described in Sections 2 through 7, with each section devoted to a particular type of record. The data fields, including the data sources, difficulties encountered, and conventions for a specific type of record are discussed in each section. A table that lists each data field; identifies sources of information used to populate each field; and enumerates data entries made by PES is included in each section. The AF-EMIS record screen is also presented for each record type.

The hard copies of Form 3952 on file at the HAZMART formed the basis of data entry in three respects. First, PES entered data for a HAZMAT only if there was a hard copy Form 3952 authorizing its use on Base; the Order's Statement of Work did not include the capture of HAZMAT in the AF-EMIS database if this material were not being acquired, stored, etc. in accordance with the HAZMAT management process authorization procedures. Second, the information contained on the hard copy Form 3952 was used as one of the standard resources for validating the information previously entered into AF-EMIS and the data entered by PES under this Order. Last, the HAZMART file contained all authorized Form 3952's on Base; therefore, this was the most extensive list of hazardous materials and was the logical choice for the basis of data entry.

Shops requiring the use of HAZMAT are required to submit a Form 3952 prior to obtaining such materials. The Form 3952 is deemed approved when it has been reviewed and signed by appropriate BE, CE, and SE representatives and forwarded to the HAZMART for input into AF-EMIS. The HAZMART will not issue HAZMAT to a shop that has not followed the Form 3952 process.

2.0

SHOP RECORD DATA ENTRY/VALIDATION PROCEDURES

AF-EMIS has two Shop record screens; these are presented as Figures 2.1 and 2.2. The Shop record data fields that the AF-EMIS stakeholders wanted updated; the sources of information PES used to update them, and the number of times data were entered by PES for each data field are presented in Table 2.1. PES used information from the Form 3952 for the shops to populate the Shop records following the procedures described below.

Shop records must be entered/validated first because each material authorization is specific to the processes in a particular shop. The Authorization record cannot be created in AF-EMIS if the shop and process codes do not already exist in the database. Shop records were created by Base personnel prior to PES' arrival for all shops at McConnell AFB, including the Kansas Air National Guard, Self Help Store and Government Operated Civil Engineering Supply Store (GOCESS).

As previously mentioned, PES entered or validated only the Process Code and Description data field of the Shop records. PES' data entry procedures/activities for this data field of the Shop record is described in the following paragraph.

Process Code and Description. The process code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur in the shop, such as industrial soldering. These fields were populated/validated for each shop based on information from the Form 3952 for that shop.

FIGURE 2.1

AF-EMIS SHOP RECORD SCREEN NUMBER 1 OF 2

Shop Page 1 of 2 -- CSA: 99, User: VISITOR

Shop Code: Date: BES WPD: Date added:

Site: End: On: Site:

Site: CSA ID: Supply System:

Shop status: DDD AAC: Funding Source:

Building: Location: Contact:

Address:

City: State: Zip:

Points of Contact:

NAME:	<input type="text"/>	Phone:	<input type="text"/>
Supervisor:	<input type="text"/>	Phone:	<input type="text"/>
USER:	<input type="text"/>	Phone:	<input type="text"/>
ENVIRONMENTAL:	<input type="text"/>	Shop Fax:	<input type="text"/>

FIGURE 2.2

AF-EMIS SHOP RECORD SCREEN NUMBER 2 OF 2

Shop Page 2 of 2 -- CSA: 99, User: VISITOR

Supply	Status	Effective Date	Process	Description

Remarks

Mission Statement

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Table 2.1 Shop Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
Process Code and Description	Form 3952	254

3.0

NSN RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate the data fields that Base AF-EMIS stakeholders wanted populated were as follows: Form 3952, Fedlog database, and MSDS (or Hazardous Material Information System (HMIS) if a MSDS were not available). The NSN record data fields; the sources of information used to populate these fields; and the number of times PES entered data for each data field are listed in Table 3.1. The AF-EMIS NSN record screen is included as Figure 3.1.

The first step for entering NSN record information was to select valid CAGE(s) (MSDS) to serve as the information basis for the data fields. The CAGE(s) were initially selected based on the presence of the associated HAZMAT in the AF-EMIS inventory module, and hence being stored in the HAZMART at the time of the record update. If the material from one or more suppliers was in the inventory, the corresponding CAGE(s) was used. In addition, the CAGE(s) associated with any MSDS(s) attached to the Form 3952s were also selected. If none of this material were in inventory and no MSDS was attached to the Form 3952, the CAGE with the most recent MSDS preparation and evaluation dates located in the General Information section of HMIS was selected. Typically, the most recent MSDS preparation date was used; however, an older MSDS was used if it were evaluated far more recently.

Another consideration in the CAGE selection was whether manufacturer information existed. If HMIS/MSDS did not have sufficient or valid manufacturer information for a CAGE, Fedlog was checked. If the CAGE did not exist in Fedlog (likely for CAGEs consisting of five letters), another CAGE was chosen; however, this was extremely rare.

Table 3.1: NSN Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
NSN	Form 3952	97
Components in NSN	Fedlog / HMIS	211
Noun	Fedlog / HMIS / 3952	100
Status	Fedlog / HMIS / 3952	97
Break NSN	Fedlog / HMIS / 3952	35
Break Qty	Fedlog / HMIS / 3952	35
Size	Fedlog / HMIS / 3952	1,458
Unit	Fedlog / HMIS / 3952	1,452
Pkg.	Fedlog / HMIS / 3952	1,448
Supply	Fedlog / HMIS / 3952	234
Seq. Tracking	Fedlog	759
Type	Fedlog / HMIS / 3952	1,428
Material	Fedlog / HMIS / 3952	1,439
Aerosol	Fedlog / HMIS / 3952	210
Outside Container	Fedlog / HMIS / 3952	148
VOC %Min (automatically calculated)	Not Applicable	N/A
VOC %Max (automatically calculated)	Not Applicable	N/A
Health Review	Form 3952	510
IEX Code	Form 3952	1,207
Physical Hazard	HMIS	1,452
Shelf Life	Fedlog	248

FIGURE 3.1

AF-EMIS NSN RECORD SCREEN

NSN -- CSA: 99, User: VISITOR

Component: Date Added: Date Last Updated:

Alt:

Specification:

Label Style: Status:

Break NSN: Break Qty: Health Review:

Issue Information: IEX Code:

Size: Physical Hazard:

Unit: Hazard Characteristic Code:

Pkg:

Supply:

Cost:

Seq Tracking: ☒

Miscellaneous:

Type:

Material:

SBS Demand Level:

☒ Aerosol ☒ EPA 17 ☒ ODC

☒ Empty Container Regulated

☒ Outside Container

VOC (L) Avg Min Max

BPA No:

BPA Vendor:

BPA Contact Period: from to

Source of Supply: Item Manager:

Acquisition Advice: Shell M:

Auth Count: CAGE Count:

Auth: CAGE:

Buttons: [Back] [Forward] [List] [Add] [Update] [Close] [Select] [Delete] [Print] [Help]

Taskbar: [Start] [Microsoft Word - REPORT] [Environmental Manager] [Taskbar Icons]

The Base did not provide a MSDS for 138 stock items (including local purchases) in time for the PES team to enter MSDS information. Forty-one of the 138 manufacturer specific items (CAGE is specified) requiring an MSDS were found in the electronic inventory (AF-EMIS Staging Area Module); however, their validity is in doubt by PES. For instance, a bottle of lubricant manufactured by the Overhead Door Company was in the electronic inventory but it is unlikely that this company manufactures oil. Another instance verified that the CAGE in the electronic inventory did not match the actual, physical inventory occurred when a product was pulled from the physical inventory and the manufacturer of this product did not match the CAGE in the AF-EMIS inventory. This has lead PES to believe that the electronic inventory for these 41 HAZMAT may be incorrect; therefore, PES recommends that McConnell HAZMART personnel manually verify the electronic inventory versus the physical inventory for these materials. Based on this discussion, 97 materials in AF-EMIS require a MSDS to complete all information that Base stakeholders wanted populated.

The procedure for selecting a CAGE for most local purchases was identical to that used for nationally procured materials, except that local purchases typically had a manufacturer's MSDS attached to the Form 3952. When a MSDS was not attached to the Form 3952, the first step was to attempt to find the LPN in HMIS using the LPN provided on the Form 3952. LPNs with a letter as the seventh digit can typically be found in HMIS. If this method did not work, searches in HMIS were attempted on manufacturers, part numbers, product names, or any other information relating to the product. This method was not successful; however, it was rarely needed as most local purchases did have an MSDS available. Most of the remaining 97 materials requiring an MSDS were mostly locally purchased items. The lack of product information supplied on the Form 3952 prevented PES from finding the MSDS in HMIS for any of these.

Once a CAGE was chosen for the NSN/LPN, all data fields were populated or validated as described in the following paragraphs.

NSN. The NSN for a stock or local purchase item was obtained from its Form 3952; however, several scenarios required that the NSN entered into AF-EMIS differ from the value listed on the Form 3952. One such scenario is related to the AF-EMIS "Break Open" feature. The supply unit of issue in the management and characteristics sections of Fedlog may indicate that the item is received by the HAZMART in bulk. If this is known to be the case, the "Break Open" feature in AF-EMIS must be used. This allows for the issue and tracking of material that is ordered in bulk, but can be either delivered as bulk (e.g., a box of 12 cans of spray paint) or as individual issues (e.g., one can of spray paint). The base NSN is for the bulk item. Another NSN, commonly referred to as "dash one NSN" because it is formed by adding a "-1" to the end of the base NSN, is created as the AF-EMIS identification number for sequential tracking of the individual units from a bulk package. The "dash one NSN" is also referred to as a "Break NSN".

PES entered data for 35 "Break" NSN records created in the database. The majority of these records involved boxes of paint, cleaner, oil, or insect repellant.

Another scenario that required a change to the NSN entered into AF-EMIS from the Form 3952 occurred when Fedlog showed that the authorized NSN had been replaced. For this scenario, the status of the pre-existing (i.e., before PES' data entry activities) NSN record status was changed to "replaced" and a remark was added discussing the replacement of this NSN record. A new NSN record was created (or if the new NSN existed in AF-EMIS, that record was updated), based on the new Fedlog data and appropriate CAGES.

Components in NSN. This data field represents the number of components, or parts, in a single NSN and was obtained by PES from either the characteristics section of Fedlog or in HMIS (typically in the Part Number/Trade Name). For most materials, such as oil, the value is one; however, some materials are multi-part kits, such as an epoxy adhesive.

Noun. The Noun is the nomenclature associated with a NSN. In AF-EMIS, it must be chosen from a pull-down list pre-loaded in the software by the Air Force. Typically, the correct Noun was available from the pull-down list for the NSN, but it was validated and occasionally changed based on information from Fedlog or HMIS/MSDS/Form 3952 for local purchases. If the required Noun did not exist in the pull-down list, it was added to the list using the AF-EMIS systems administration module.

Status. The Status of a NSN record was always entered as "active" unless the material was not authorized for use by any shop on Base. For instance, if a material was replaced (see discussion under NSN above), the Status was assigned "Replaced". As the last step of updating the NSN records, PES changed the status of NSN records for unauthorized material use to "Inactive".

Break NSN. This data field was used for bulk materials and compressed gases when using the Break Open feature of AF-EMIS. See discussion under NSN above on when to use this feature. The Break NSN was entered in the base NSN record; this data field is left blank in the Break NSN (dash one) record. Also note that the Break NSN record must be created before this data field can be populated in the base NSN record.

Break Qty. This data field represents the number of individual items indicated within the base NSN (from which the "dash one NSN" was created), such as 12 cans of paint in a box. As was the case for the Break NSN data field, it was

used when the Break Open feature was required and could not be populated until the Break NSN record was created.

Size. This data field gives the quantity of HAZMAT shipped in the container provided by the supplier. The management and characteristics sections of Fedlog or general information section of HMIS indicated the appropriate Size for a given NSN. When PES began the data entry, the size data field for all NSN records was either empty or was incorrectly populated with packaging information (e.g., box or bottle) rather than HAZMAT size units of measurements. PES updated these fields to mass (e.g., pounds) or volumetric (e.g., gallons) units using data from Fedlog.

Size information for local purchases was typically based on the Form 3952 for each material as Fedlog was not available for local purchases and HMIS records or MSDSs rarely listed such data for these items. If the Form 3952 did not include sufficient data, the Size was based on typical quantities for similar materials. For example, the typical size for spray paint was one pint. If a typical quantity did not exist for some HAZMAT, PES did not populate the size related data fields and requested the size of these materials from LG personnel. Overall, there were 57 materials that were in need of container sizes; however, no sizes were provided. Most of the missing size data (and MSDS data) originated from a single base shop; the Arts and Crafts Shop had 47 locally procured materials which were missing a MSDS and container sizes.

Unit. The Unit represents the stock item's mass or volumetric unit of measurement within the package specified by the NSN; it was chosen from a pull-down menu. The management and characteristics sections of Fedlog or general information section of HMIS indicated the Unit for each NSN. Most of the Unit data entered into the AF-EMIS database before PES started its data

entry was found to be incorrect and was changed to the right values of pounds or gallons.

Pkg. This data field is the packaging specific to the NSN. The management and characteristics sections of Fedlog or general information section of HMIS give the packaging for each NSN. In AF-EMIS, it was chosen from a pull-down menu, which provided the same choices as Unit; however, this field was not the same as Unit. Instead of mass or volumetric units of measurement, the packaging is the physical container for the material, such as a bottle, can, box, roll, cylinder, drum, etc. This data field had to be updated for most NSN records.

Supply. This data field is used for identifying the unit of issue that the supply system uses when ordering a material and is obtained from the management section of Fedlog. This field rarely required updating as the pre-existing Supply data was typically correct.

Seq. Tracking. This data field enables the sequential tracking feature in AF-EMIS and is locally established through the use of a three way check box. The box is checked "yes" (indicated by an "X" in the box) for all materials. The second and third options, which were never used, was "no" (indicated by an empty, non-shaded box) and "unknown", indicated by an empty, shaded box.

Type. The Type data field represents the type of container the material is packaged in, such as can, box, bottle, etc. It was chosen from a pull-down menu and matched the Pkg. data field. If none of the choices in the pull-down menu match the Pkg. field, "other" was selected (typical for unusual packages such as rolls of solder). Also, for a NSN record that had a Break NSN, the Type data field for the base NSN reflected the individual units' container, not the package containing the individual units (i.e., the bulk package). This data field was populated for all NSN records.

Material. The container material of construction (i.e., glass, metal, plastic, or cardboard) is entered in the Material data field. As is the case with the Type data field, it was limited to the options in a pull-down menu and did not represent the outside container of the original NSN when the Break Open feature was utilized. This field was also populated for nearly all NSN records.

Aerosol. The Aerosol data field is a three-way check box with yes, no and unknown options. If the characteristics section of Fedlog or the constituents in HMIS indicates that the material is an aerosol, the box was toggled to contain an "X"; otherwise the box was left empty and non-shaded. In the pre-existing database (prior to PES' efforts), this data field was rarely checked with an "X" regardless of whether it was an aerosol or not.

EPA 17. This three-way check box indicates the possible presence of an EPA-17 regulated chemical within the material. Because there may be multiple CAGEs with different constituents for a given NSN, this data field does not indicate that the HAZMAT corresponding to the NSN does in fact contain an EPA 17 chemical. It only indicates that at least one supplier of the HAZMAT includes an ingredient that is an EPA 17 chemical. Because it has no bearing on EPA-17 related calculations, this data field was not populated. This decision was made jointly by PES and representatives from BE and CE.

ODC. Similar to the EPA 17 data field, ODC indicates, through the use of a three-way check box, the possible presence of an ozone depleting chemical. Because it has no bearing on ODC related calculations, this data field was not populated. This decision was made jointly by PES and representatives from BE and CE.

Empty Container Regulated. This data field indicates whether or not disposal of the empty container of the material is regulated. This data field was not

populated because the post-use treatment of the empty container may vary the regulated status of an empty container.

Outside Container. This data field indicates that the material is contained within an outside container through the use of a three way check box. The box was checked "yes" if an outside container were used, such as for bulk materials when the Break Open feature of AF-EMIS (i.e., box of metal cans containing paint) was used. Otherwise, the box was checked "no". The third option, which was never used, is "unknown", indicated by an empty, shaded box. PES changed the "unknown" for many of the NSN records to "no" or "yes" as appropriate.

VOC (%) Avg., Min., and Max. These data fields represent the average, minimum, and maximum percent by weight concentration of volatile organic compounds. This information is AF-EMIS-generated based on information entered in the associated CAGE record(s).

Health Review and IEX Code. The Health Review data field is based on the Issue Exception (IEX) Code. These data fields were populated based on information from the Form 3952. If the Form 3952 did not include this information and the Health Review and IEX Code data fields were already populated, they were left unchanged. If one field was populated, the other field was assigned the matching value (both fields showed the IEX Code).

Physical Hazard. The Physical Hazard data field represents the physical hazards associated with the material. A pull-down menu provides a set number of choices. This data field was populated/verified in conjunction with the Hazard Characteristic Code data field. In the general information section of HMIS, the hazard characteristic code, if available, is given by a code consisting of one letter followed by one number, such as F1. This code is the same code as the Hazard Characteristic Code in AF-EMIS; the associated pick-list shows each code along

with a description of that code. This description corresponds to the options in the Physical Hazard data field.

There were three situations for which the exact code and description given in HMIS was not used to populate this data field in AF-EMIS. The first situation was when HMIS showed a hazard characteristic code of "N1", the corresponding description in the AF-EMIS Hazard Characteristic Code was "Nonhazardous Material". Because this option does not exist under Physical Hazard, "No Specific Hazard" was used instead.

Another situation was when HMIS did not list a hazard characteristic code. When this occurred, the transportation data section of HMIS, which occasionally describes the physical hazards associated with the material, was checked. For this situation, the Hazard Characteristic Code was left blank and the option under Physical Hazard that best fit the description given in HMIS was selected.

The last situation was when HMIS did not list a hazard characteristic code or informative transportation data for the HAZMAT. When this occurred, the Hazard Characteristic Code was left blank and "No Specific Data" was chosen from the pull-down menu under Physical Hazard. The Physical Hazard data field was populated or updated for virtually all NSN records.

For a manufacturer MSDS, the physical hazard was obtained by searching the entire MSDS for data that would indicate the physical hazard of the material. Typically, the transportation data section or hazard identification section would indicate any physical hazards.

Shelf Life. This data field represents the amount of time, selected via a pick-list, a material can remain unused in storage before it must be tested, disposed, or reconditioned. Typically, Shelf Life did not need to be updated for NSNs;

however, the shelf life for local purchases was often entered as "unknown" because the information was not available (no Fedlog information for local purchases).

4.0

MANUFACTURER RECORD DATA ENTRY/VALIDATION PROCEDURES

Manufacturer records were updated/validated using both HMIS/MSDS and Fedlog. HMIS/MSDS was used to provide search information in retrieving data in Fedlog, which was typically more up-to-date. Many of the most recent MSDSs for products were several years old; however, Fedlog is updated monthly with more recent information.

Once the NSN record was updated, the Manufacturer record was populated next. It is necessary to populate the Manufacturer record before the CAGE record because the latter cannot be created unless the CAGE data field in the Manufacturer records has been entered into the AF-EMIS database.

While the Manufacturer records are not directly connected to NSN records, they are indirectly linked via the CAGE record. Once a Manufacturer record for a given CAGE has been updated, it did not need to be updated again if the same CAGE were used for a different NSN record. For instance, if one manufacturer (CAGE) makes ten different colors of spray paint (each color would have a different NSN record), the Manufacturer record only needed to be updated one time. For this data entry/validation task, PES determined if a Manufacturer record needed updating by inspecting the system-generated Date Last Updated data field. If this date was before the PES data entry team arrived onsite, the record needed to be updated.

Also, when a CAGE record is imported from HMIS, manufacturer information is imported as well. If the manufacturer data were updated using Fedlog before the CAGE record were imported from HMIS, the Fedlog-based data (which reflects the most recent information) is overwritten with the older data from HMIS. There are two approaches for avoiding this problem. One approach is not to use the

electronic HMIS import feature; data needed from HMIS is manually transferred to AF-EMIS. The other approach is to verify that the manufacturer CAGE has been entered in the NSN record, import the CAGE record electronically from HMIS, and then enter/validate the Manufacturer record. PES utilized the first approach.

Table 4.1 lists the Manufacturer data fields that the Base AF-EMIS stakeholders wanted populated; the associated sources of information PES used to populate them; and the number of times data were entered for each data field. The AF-EMIS Manufacturer record screen is presented as Figure 4.1. Much of the Manufacturer record data had already been pre-loaded by the AF-EMIS software developer before PES arrived onsite and the entered data were typically correct. Data entry/validation by PES was fairly straightforward.

Table 4.1. Manufacturer Record Data Fields With Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
CAGE	AF-EMIS Inventory Module / HMIS	147
Status	See Discussion	149
Distributor	See Discussion	213
Company Name	Fedlog / HMIS / MSDS	238
Address	Fedlog / HMIS / MSDS	338
City	Fedlog / HMIS / MSDS	417
County	Fedlog / HMIS / MSDS	0
State	Fedlog / HMIS / MSDS	193
Country	Fedlog / HMIS / MSDS	173
Zip	Fedlog / HMIS / MSDS	417
Phone	Fedlog / HMIS / MSDS	410
Fax	Fedlog / HMIS / MSDS	137

FIGURE 4.1

AF-EMIS MANUFACTURER RECORD SCREEN

Manufacturer -- CSA: 99, User: VISITOR

Date Added: Date Last Updated:

CAGE: Status: Distributor:

Replacement CAGE: CAGE Count:

Company Name:

Address:

City: State:

County: Zip:

Country: Phone:

Remarks:

Buttons: [List] [Add] [Update] [Delete] [Select] [Print] [Help]

Windows: [Start] [Microsoft Word REPORT] [Environmental Manager] [Taskbar]

CAGE. This data field is the HAZMAT vendor's Commercial and Government Entity (CAGE). The majority of the CAGE data fields had already been entered into the AF-EMIS database by the Logistics Group before PES began its data entry. Only 147 CAGEs needed to be entered, which brought the total number to 757.

Status. For all Manufacturer records associated with a CAGE chosen for use in the NSN record, the Status was "Active". The other Manufacturer records were left unchanged.

Distributor. This data field identifies if the manufacturer is a distributor, as indicated by "Yes" or "No". There was no specific source for this information; therefore, the data team made two assumptions regarding the distributor field. First, if the data field was populated, it was assumed correct. Otherwise, the field was set to "No" unless the manufacturer name indicated that it was a distributor.

Company Name, Address, City, County, State, Country and Zip Code. These data fields relate to the location of the HAZMAT vendor/manufacturer. All data entry/validation for these fields was performed with no difficulties, except for the County field, which was rarely listed in Fedlog or HMIS. Because there were no available data, the County data field was left blank.

Phone and Fax Numbers. These data fields were also entered/validated with little difficulty. Fax numbers were sometimes left blank because they were not listed in HMIS or Fedlog.

5.0

CAS RECORD DATA ENTRY/VALIDATION PROCEDURES

As mentioned in Section 1.3, CAS records were not updated because AF-EMIS Version 6.0, which is scheduled for release in August 1999, will contain updated CAS records, including some new fields. If PES would have made any updates to the current version of AF-EMIS, they would be overwritten by the new CAS records associated with AF-EMIS Version 6.0.

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6.0 CAGE (MSDS) RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate information for the CAGE record data fields that the Base AF-EMIS stakeholders wanted updated were as follows: Fedlog database and HMIS or MSDS. Table 6.1 lists these CAGE (MSDS) record data fields; the sources of information that PES used to update them; and the number of times data were entered for each data field. The AF-EMIS CAGE (MSDS) record screens are included as Figures 6.1 and 6.2.

A significant amount of time was spent "cleaning-up" the CAGE (MSDS) records because of two factors. First, some NSN records had multiple (up to 120) CAGE (MSDS) records associated with them. The only CAGE (MSDS) records that were needed for a NSN record were those for which their CAGE(s) were in the AF-EMIS inventory module (indicating that HAZMAT from the vendor corresponding to the CAGE was actually in the HAZMART) and those attached to the Form 3952. If the manufacturer-specific (specified by the CAGE) material were not in inventory or the material's MSDS were not attached to the Form 3952, the CAGE specific MSDS with the most recent MSDS preparation date was used (see NSN discussion). To allow for easy identification of the CAGE records selected by PES and the HAZMART staff to be kept active in the database, all other CAGE (MSDS) records were assigned appropriate Ounces and Types and the Status was set at "Inactive" (See Section 3 for more details on this issue).

The second factor regarding CAGE (MSDS) records was the "CAGE Component No." and "CAGE Version" fields. When a new version of a MSDS is obtained, a new CAGE (MSDS) record should be created utilizing the same CAGE but changing the "CAGE Version" to the next letter value (i.e., old version "B", new version "C"). The CAGE (MSDS) records already in the AF-EMIS before PES

Table 6.1 CAGE (MSDS) Record Data Fields with Sources of Information and Number of PES Entries

Data Field	Source of Information	Number of PES Entries
NSN	Form 3952 / HMIS	1,416
CAGE	AF-EMIS Inventory Module/ HMIS	1,416
CAGE Status	Inventory / MSDS Date	5,571
CAGE Version	HMIS / MSDS	1,582
CAGE Component No.	HMIS / MSDS	1,546
Part No. or Trade Name	HMIS / MSDS	1,852
DOT Shipping Name	HMIS / MSDS	2,052
MSDS Date	HMIS / MSDS	1,777
Health Review Code	HMIS / MSDS	2,050
Health Hazard	HMIS / MSDS	2,019
Physical Hazard	HMIS / MSDS	2,059
Ounces	Fedlog / HMIS / Form 3952	5,475
Type	Fedlog / HMIS / Form 3952	5,262
pH Type	HMIS / MSDS	1,999
pH Min. and Max.	HMIS / MSDS	283
VOC with Units	HMIS / MSDS	932
Specific Gravity	HMIS / MSDS	1,803
Density	HMIS / MSDS	1,803
Vapor Pressure with Units	HMIS / MSDS	1,182
Constituents – CAS	HMIS / MSDS	6,977
Constituents – Chemical Name	HMIS / MSDS	6,977
Constituents – Amount Min. and Max.	HMIS / MSDS	6,320
Constituents – Concentration Units	HMIS / MSDS	6,320
Constituents – % Weight or Volume	HMIS / MSDS	6,324
Constituents – Chemical Form	HMIS / MSDS	7,453
Constituents – Chemical State	HMIS / MSDS	7,453

AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 1 OF 2

Pacific Environmental Services

AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 2 OF 2

Pacific Environmental Services

initiated its data entry did not reflect the use of this procedure; the "CAGE Component No." was increased instead. The Component Number should be used for multi-part kits, such as a two-part epoxy. This incorrect procedure resulted in CAGE (MSDS) records with multiple components for a single component material. To resolve this error, PES assigned the additional components near zero size in Ounces and Types (zero cannot be entered) and inactivated the record. Next, the correct CAGE version and component(s) were created. A total of 3,977 CAGE (MSDS) records were inactivated for this reason.

The Base did not provide a MSDS for 138 stock items (including local purchases) in time for the PES team to enter MSDS information. As discussed in Section 3, 41 of the 138 manufacturer specific items requiring an MSDS were found in the electronic inventory (AF-EMIS Staging Area Module); however, their validity is in doubt by PES. PES recommends that McConnell HAZMART personnel manually verify the electronic inventory versus the physical inventory for these materials. The remaining 97 materials (138 minus 41) in AF-EMIS require a MSDS to complete all information that Base stakeholders wanted populated.

Once the correct CAGE(s) had been identified as part of NSN record population and all others made inactive, all the CAGE record data fields were entered or verified.

One method not utilized was the "Import MSDS from HMIS" feature in AF-EMIS. Use of this feature automatically populated the following CAGE (MSDS) record data fields:

- NSN;
- CAGE;
- CAGE Version;
- CAGE Component Number;

- CAGE Status;
- Part Number or Trade Name;
- MSDS Date;
- HMIS MSDS Number;
- Ounces with Type;
- pH Type/Minimum/Maximum;
- Vapor Pressure with Type;
- Specific Gravity;
- Constituent CAS;
- Constituent Name;
- Constituent Concentration with Units; and,
- Constituent Weight or Volume Percent.

Although this information is imported directly from HMIS, it should be checked to assure that the import procedure worked correctly. In some instances, corrections are required to imported information, such as Vapor Pressures with Type. For these data fields, AF-EMIS may import the Vapor Pressure and Temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes is imported in the Vapor Pressure field as 5070 mm Hg. Also, some constituents are not always imported because the HMIS CAS data field is either blank or incorrect.

PES did not utilize the AF-EMIS Import MSDS feature because of the need to verify and correct some imported data fields. Instead, the HMIS information was manually entered into the database. This method worked well when two computers were used; one machine had AF-EMIS on-screen while the other had HMIS on-screen. Since some information had to be entered/validated manually even when the electronic import feature was used, it was more efficient to manually enter all information rather than to execute the electronic import, check imported information, then enter the remaining data.

NSN. The NSN was obtained from the Form 3952. The number of NSNs entered into AF-EMIS CAGE records by PES is the sum of NSNs associated with added NSN records and the NSNs associated with the CAGE (MSDS)

records created to correct the CAGE version and component(s), as described above.

CAGE. The CAGE numbers to be entered were chosen as described in the NSN record discussion in Section 3.

CAGE Status. This data field establishes the status of the CAGE (MSDS) record as "active" or "inactive". Each NSN record must have at least one "active" CAGE (MSDS) record. As discussed above, a CAGE (MSDS) was chosen based on three criteria. The first criteria was that the AF-EMIS inventory module showed that some of the HAZMAT from the supplier identified by the CAGE was in the HAZMART; if the HAZMAT corresponding to this NSN/CAGE combination was in the inventory, this CAGE (MSDS) was "active". The second criteria was, if the CAGE specific MSDS was attached to the Form 3952, this CAGE (MSDS) was also "active". Otherwise, the "active" CAGE (MSDS) was the most recent MSDS (CAGE) as determined by PES from a review of MSDS preparation and evaluation dates located in the General Information section of HMIS. Typically, the most recent MSDS preparation date was used; however, an older MSDS was used if it were evaluated far more recently. Additional information on this topic is provided in Section 3.

As discussed above, a large number of CAGE records were updated to inactivate CAGE records for suppliers that are currently not being used on Base and those that were incorrectly assigned improper versions and CAGE component numbers. PES either updated/validated the status of 5,571 CAGE (MSDS), many of which were for new CAGE records.

CAGE Version. The CAGE Version data field represents the version of the MSDS. This field is indicated in the HMIS data field "Part No. Indicator" under the top section (untitled).

As noted previously, when the database contained multiple versions of a MSDS, there should be a CAGE (MSDS) for each version. Each record should have the same CAGE code but a different CAGE Version with the next letter value (i.e., old version "B", new version "C"). The CAGE (MSDS) records in AF-EMIS when PES began its data entry did not reflect the use of this procedure; the "CAGE Component No." was increased instead.

To correct this problem, the correct version/component was created and the CAGE (MSDS) records with incorrect "CAGE Component No." were assigned near zero sizes (Ounces and Type) and inactivated.

For multi-component HAZMAT, HMIS lists a different CAGE version for each component. For example, Part One of the multi-component HAZMAT may be listed in HMIS as Version A, and Part Two listed as Version B. PES entered all parts of a multi-component HAZMAT with the same version in the AF-EMIS database. If the components in HMIS were not listed in alphabetical order, remarks were added to each CAGE record clarifying which HMIS MSDS version letter corresponds to each component constituent number.

CAGE Component Number. For multiple component HAZMATs, a separate CAGE record must be created in AF-EMIS for each component. The CAGE Component Number data field identifies the component for which the information is presented in the CAGE record. While most materials were single part or component products, this data field was designed to accommodate multi-part kits, such as a two-part epoxy. In HMIS, the CAGE Component Number was typically found in the Part Number or Trade Name field. In addition, Fedlog and the Transportation Data section of HMIS would show occasionally component information.

As with the CAGE version, PES found the CAGE component to be incorrect for many of the CAGE records. The CAGE (MSDS) record data was entered incorrectly with respect to CAGE Version and CAGE Component. These errors were corrected by establishing proper CAGE (MSDS) records, and assigning near zero sizes (Ounces and Type) and inactivating the incorrect CAGE (MSDS) records as discussed previously.

Part Number or Trade Name. This data field contains the manufacturer's (or vendor's) part number or trade name for the material. It can be found in the HMIS data field "Part Number/Trade Name", located in the top section of the HMIS screen. Typically, the Part Number or Trade Name pre-loaded in the CAGE records by the AF-EMIS software developer required only minor revisions by PES.

DOT Shipping Name. This data field represents a combination of the Department of Transportation (DOT) Identification Number and Proper Shipping Name for the material. A pick-list provided many of the shipping names that PES needed, including a selection of "Not Regulated" if the material was not regulated by DOT. A small number of materials had DOT shipping names that were not on the pick-list. For these materials, the shipping name was manually typed into the DOT Technical Name data field, which is located below the shipping name. DOT Shipping Names were populated for all active CAGE records.

MSDS Date. The MSDS Date represents the date the MSDS was prepared or revised. Along with the data field HMIS MSDS Number, these data fields are the basis for the Import MSDS feature. It can be found in HMIS as "Date MSDS Prepared" in the General Information section or near the beginning or end of manufacturers' MSDSs.

Health Review Code. This data field is identical to the IEX Code data field in the associated NSN record. To quickly access the associated NSN record, there is a "NSN" button located in the bottom left corner of the first page of the CAGE (MSDS) screen. "Clicking" the mouse pointer on this button will reveal a summary of all NSN record data fields for that NSN. Upon closing this NSN summary, the same IEX Code was entered in this Health Review Code data field.

Health Hazard. This data field represents the specific hazard to human health. It is on page one of the CAGE (MSDS) record screens; another non-required Health Hazard data field that the Base AF-EMIS stakeholders did not request PES to update is on page two of the CAGE (MSDS) screens.

A pick-list containing various health hazards, such as irritant or carcinogen, is provided. This information was found in the Health Hazard Data section of HMIS. The information in this section did not identify a specific health hazard; interpretation of the information was required. Typically, materials were described as an irritant. Some materials had other specific hazards listed, such as carcinogenicity.

Physical Hazard. This data field is identical to the Physical Hazard data field in the associated NSN record. As described for Health Review Code above, this information was copied from the NSN record using the "NSN" button.

Ounces. This AF-EMIS-mandatory data field specifies the number of ounces per unit of issue as indicated in the NSN record for that material. The ounces are either in terms of weight or volume; the next data field, "Type", provides this selection. The information used by PES to populate this field was obtained by converting the units of measurement of the Size and Unit data fields in the NSN record to weight- or volume-based ounces.

With respect to units of measurement, the ounces data field represented typical conventions. For instance, a quart of oil would be entered as 32 fluid ounces or a pound of grease as 16 net ounces. As long as the specific gravity and density are entered correctly (especially for compressed gases), it does not matter whether the ounces are measured by weight or volume.

The Ounces and Type data fields are used to generate storage and usage reports used for regulatory reporting, such as the Chemical On-Site Summary and Issues Containing EPA 17 chemicals. Thus, it is crucial that these fields be entered correctly. PES found that many of the Ounces and Type fields were incorrect or blank. One typical error found by PES was that pounds were entered in the Ounces field.

As noted previously, when the AF-EMIS database contained multiple versions of a MSDS, multiple CAGE (MSDS) records were created utilizing the same CAGE, but a different CAGE Version formed by entering the letter that follows the one used in the record being replaced (i.e., old version "B", new version "C"). PES found that the CAGE (MSDS) records did not reflect the use of this procedure; the "CAGE Component No." was increased instead. To correct this problem, a new CAGE record with the correct version/component was created and the Ounces data field of the incorrect CAGE (MSDS) records was changed to a near zero size and the record was inactivated.

Type. This data field indicates the measurement unit for the value entered in the Ounces data field. A pick-list provides two choices; fluid for volumetric units or net for mass units. As discussed above, this data field must be entered correctly as numerous reports are generated using this data.

pH Type, Minimum, and Maximum. The pH Type data field is populated from a pick-list to indicate whether pH is not applicable to the HAZMAT material ("N/A")

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or if the value is entered as a range ("Range"). If the Type is not applicable, the Minimum and Maximum data fields were left blank. If a pH was available, the pH type was "Range" and the minimum and maximum values were entered. If a single pH value was given in HMIS or a MSDS, the value was entered in both the Minimum and Maximum data fields. The pH value was given in HMIS for only 283 of the HAZMATs handled at the Base; PES entered these values in the AF-EMIS database.

VOC with Units. The VOC data field represents the amount of volatile organic compounds in the HAZMAT. The Units data field is a pick-list with the following choices: weight percent (%), pounds per gallon (lbs/gal), grams per liter (g/l), and not applicable (N/A). If no VOCs were present in the HAZMAT, the VOC data field was left blank and "N/A" was chosen from the Units pick-list. If VOCs were present in the HAZMAT, the value was entered and the appropriate units were selected. If the units were pounds per gallon or grams per liter, it was necessary to use the AF-EMIS unit conversion feature. There is a button labeled "Convert" near the Units data field; clicking the mouse pointer on this button converts these units to a weight percentage.

VOC information was found either on a MSDS or in HMIS, typically under the Physical Characteristics section. Occasionally, the VOC concentration was included in the ingredients information or transportation data section.

Care must be taken to note whether the VOC concentration is reported in terms of weight or volume. MSDSs and the HMIS ingredients information typically noted weight or volume units. In the HMIS Physical Characteristics section, the VOC concentration was reported in terms of volume. When VOC units were presented in terms of volume only, data was entered with respect to volume as this provided a reasonable estimate of the VOC weight concentration. Verification of volume-based VOC concentrations were based on a review of the

actual ingredients; adjustments were made for some VOC concentrations after this review.

Specific Gravity and Density. The specific gravity and density of the HAZMAT were available from a MSDS or HMIS for nearly all of the authorized materials. When the MSDS or HMIS did not have a specific gravity or density, the HAZMAT was typically a solid; the specific gravity and density were given for some solid materials. The specific gravity was located in the Physical Characteristics section of HMIS. The density, reported in pounds per gallon, was calculated by multiplying the specific gravity by the density of water, 8.34 pounds per gallon.

Vapor Pressure, Type, and Measure Temperature. These data fields represent the vapor pressure, with units (pounds per square inch or mm Hg) and reference temperature of the HAZMAT. Approximately one half of the materials had a vapor pressure sufficiently high enough to report (above 0.01 mm Hg). The remaining materials were solids or liquids with low vapor pressures, such as oil.

As previously mentioned, corrections were required for electronically imported vapor pressures. For these data fields, AF-EMIS would import the vapor pressure and temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes was imported in the vapor pressure field as 5070 mm Hg.

Constituent CAS and Name. The constituent data fields were populated by using the "Constituents" button located on the bottom left portion of the second screen. The Constituent CAS data field is a pick-list of the CAS numbers from the CAS records. Upon entering the CAS number from HMIS or a MSDS in the data field, the corresponding chemical typically appeared. Sometimes no chemical name would appear or the chemical name that appeared was incorrect. This situation resulted because either the CAS was not in the AF-EMIS CAS

records or the HMIS CAS number was incorrect. If the AF-EMIS Import MSDS feature were used, such constituents would not be imported. In such cases, a search for the chemical name using the CAS pick-list search was utilized which allowed PES to locate the needed constituents. Material constituents listed in HMIS with generic names, such as additives, were not entered into AF-EMIS.

PES entered/validated nearly 7,500 constituents into the McConnell AFB AF-EMIS database. Some of this effort was required to replace constituent data lost when a new CAGE record was created to correct for the improperly entered CAGE Versions.

Constituent Concentration Minimum, Maximum, Concentration Units, and Percent By Weight or Volume. These data fields all relate to the amount of constituent in an authorized HAZMAT. The Minimum and Maximum data fields represent the numeric minimum and maximum concentrations of the constituent in the authorized HAZMAT. If a single value was shown in HMIS, this value was entered for both fields. The Concentration Units data field provided three options for the minimum and maximum concentrations: parts per million (ppm), parts per billion (ppb), or percent (%). In all cases, PES entered the concentration in percent. When percent is selected from the units data field, another data field appears; percent by weight or volume. Most HMIS records and MSDSs reported concentrations in percent by weight; however, a few constituent concentrations were reported in units other than weight percentages. These concentration units were clearly identified as ppm, ppb, or volume percent. If the concentration units were specified as units other than weight percent, those units were used. If the concentration units were not specified, weight percent units were selected because this is the typical unit reported on an MSDS.

EPCRA Chemical Form. This data field represents the constituent form as defined by EPCRA Form R reporting. There are two options provided in the

pick-list; pure or mixture. The majority of constituents were reported as a mixture. A pure form was selected for materials that consisted entirely of one constituent, such as pure gases.

EPCRA Chemical State. This data field represents the constituent state as defined by EPCRA Form R reporting. The following states are available in the pick-list: solid, liquid, gas, fine powder or dust, fibrous, molten, dissolved in solution, and fume. The majority of constituents were either a solid, liquid or gas. The remaining options apply to only a few chemicals (i.e., fibrous aluminum oxide).

It should be noted that AF-EMIS does not account for the generation of EPCRA-regulated materials from reaction of air emissions. Care must be taken to account for such scenarios as they are required for EPCRA reporting.

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7.0

AUTHORIZATION RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate the Authorization record data fields that the Base AF-EMIS stakeholders wanted updated were as follows: Form 3952 and HMIS or MSDS. The AF-EMIS Authorization record screens are included as Figures 7.1 and 7.2. Table 7.1 lists the authorization data fields to be updated; the source of information PES used to update each; and the number of times data were entered for each data field.

There were 2,570 valid Form 3952s on file at the McConnell AFB HAZMART. Information on most of these authorizations were already entered in AF-EMIS by the Logistics Group; however, not all of the data that the Base AF-EMIS stakeholders wanted updated were populated. Typically only data fields that are mandatory for creating the Authorization record were populated. In addition, any expired and/or invalid authorizations that remained in AF-EMIS as active authorizations were made inactive by PES.

Populating the Authorization record is the last step in entering/validating authorized materials in AF-EMIS. Because the authorized NSN and shop numbers have been established to create the NSN and shop records, respectively, these numbers were available for entry into the Authorization records.

NSN. The NSN data field was entered or validated from data on the Form 3952. As described above, most of the authorizations were already entered into AF-EMIS by the Logistics Group. PES entered an additional 436 authorizations from Form 3952. The majority of these additions was due to changing authorized NSNs to Break NSNs.

FIGURE 7.1

AF-EMIS AUTHORIZATION RECORD SCREEN NUMBER 1 OF 2

Authorization Page 1 of 2 -- CSA: 99, User: VISITOR

Date Added: Date Last Updated:

Item: Shop Code: ☒ New Process ☒ ODE

Process: ☒ Waiver ID: Application: ☒

Name: ☒ EPCRA 311/312 Exempt: ☒ EPCRA 313 Exempt: Industrial Equipment No.:

Amount Authorized: Draw Frequency: ☒ Draw Balance: ☒ Here Here Date:

Justification:

Weapon: Justification: Technical:

How Used:

Start: Microsoft Word Environment Microsoft Excel 3:48 PM

FIGURE 7.2

AF-EMIS AUTHORIZATION RECORD SCREEN NUMBER 2 OF 2

Authorization Page 2 of 2 -- CSA: 99, User: VISITOR

Environmental Review

Disposal:

Delete Reason:

State Next Action: Next Action: ☐

Date Reviewed: Reviewed By:

Remarks:

☒ Print Remarks

Health Review

Record:

Date Reviewed: Reviewed By:

Remarks:

☒ Print Remarks

Page:

Start Microsoft Word Environment Microsoft Excel

Table 7-1. Authorization Record Data Fields with Sources of Information and Number of PES Entries

Data Field	Source of Information	Number of PES Entries
NSN	Form 3952 / HMIS	436
Shop Code	Form 3952	414
Status	Form 3952	1,959
Process	Form 3952	1,396
New Process	Form 3952	717
ODC (system generated)	System Generated	System Generated
ODC Application	Form 3952	0
Draw Amount	Form 3952	636
Draw Frequency	Form 3952	664
Reset	HAZMART Personnel	770
Justification – Weapon System	Form 3952	339
Justification – Justification Type	Form 3952	1,213
Justification	Form 3952	1,231
Justification – Technical Order	Form 3952	1,208
Justification – Page and Paragraph Number	Form 3952	980
Justification – Date and Revision	Form 3952	686
Justification – Remarks	Form 3952	128
How Used	Form 3952	2,080
Disposal	Form 3952	1,092
Remarks – Disposal	Form 3952	550
Date Next Action	Form 3952	748
Next Action	Form 3952	476
Health Review – PPE	HMIS / MSDS	7,614

Shop Code. This data field identifies the shop that is authorized to use the specific material. The shop code was obtained by comparing the supply account code from Form 3952 to a Base-created list of supply account codes with shop codes.

Status. The status of the authorization was obtained using a pick-list. If the Form 3952 was signed by a representative from CE, SE, and LG and was not expired, the status was "Active". After all records were entered/validated for a shop, the authorizations for each shop were checked for quality assurance against a spreadsheet developed by the data team.

Process. The process code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur in the shop, such as industrial soldering. This field was populated using a pick-list established in the Shop records.

Nearly 1,400 authorizations required a change in the process code because the process code in the AF-EMIS authorization did not match the process code written on the Form 3952. PES suspects that the AF-EMIS process code was established correctly from original Form 3952s; however, renewal of these Form 3952s may have included process code revisions that were not made in AF-EMIS.

In order to change the process code in AF-EMIS for an authorization, a new authorization record must be created. The new record is created by changing the process code and saving the record as new by pressing the "Add" button on the bottom of the screen. The "Update" button is not available when the process code is changed. Pressing the "Add" button will create a new authorization record identical to the old one with a new process code; however, any personal protective equipment and technical order information associated with the old

authorization is lost and must be re-entered. In addition, the old authorization record must be opened again and assigned an inactive status and proper "delete reason".

New Process. This data field is a three-way check box (yes, no, or unknown) used to indicate whether a process was newly created. This information was not listed on the Form 3952. The check box was left blank by PES for all authorization records indicating that the process was not new.

ODC. This check-box indicates that an ODC may be present in the authorized material. This data field is automatically populated by AF-EMIS through a direct link to the ODC check-box in the NSN records.

Application (if ODC). This pick-list data field indicates how the HAZMAT is used if it is an ODC. The pick-list provides the following four options: solvent, fire suppressant, refrigerant or other. Since the ODC check-box is CAGE-specific and authorizations are not CAGE-specific, this data field was not populated because the material may or may not contain an ODC depending on supplier (CAGE). Even though this field was not populated, the method of use was always populated in the How Used data field described below.

EPCRA 311/312 Exempt and EPCRA 313 Exempt. These data fields indicate if the authorized material and process for which it is used is exempt from EPCRA 311/312 and 313 reporting requirements. These exemptions are based on the material's method of use, purpose, packaging, potential for exposure, and intended consumer.

At the Kick-off Meeting, it was agreed to leave these data fields blank because it is far more time efficient to apply the exemptions after reporting threshold calculations have been performed. This method minimizes the unnecessary

process of applying exemptions to materials that will never exceed reporting thresholds.

Draw Amount and Draw Frequency. These data fields represent the quantity of material a shop is authorized to be issued over a given period of time, e.g., two cans per week. These data fields were typically populated correctly; the only PES revisions/inputs required were associated with new authorizations or renewals of existing authorizations.

The Draw Frequency data field is a pick-list consisting of the following time periods: daily, weekly, monthly, quarterly, semi-annually, annually, greater than annually, and one-time only. If the frequency shown on Form 3952 did not match any of the pick-list frequencies, PES entered a Draw amount and frequency that was equivalent to the value on the Form 3952 (e.g., four cans per week would be entered for eight cans bi-weekly).

Reset. This data field (check-box) indicates if the draw balance should be reset after each draw. At the request of HAZMART personnel, the check-box was set to "Yes" for all authorizations except one-time only draw frequencies.

Justification – Weapon System. This data field indicates any weapon systems that require the use of the particular HAZMAT. A pick-list containing codes was used to populate this data field. Approximately one-quarter of all justifications created had a weapon system specified, usually specified in the title of the Technical Order. The two weapon systems used at McConnell AFB were the KC-135 and B-1B aircraft.

Justification – Justification Type. The justification type represents the type of justification with respect to the source of the justification, such as Air Force, Army, commercial, or government. The pick-list option "Air Force" was used for

all technical orders other than manufacturer's operation and maintenance manuals.

Justification – Justification. The justification data field is a pick-list containing the type of document that contains the justification for the use of the HAZMAT. Typically, the justification was either a Technical Order or Manufacturer's Manual.

Justification – Technical Order. This pick-list contained specific titles of justifications specified under the Justification data field. If a specific title was not on the pick-list, the system administration module was used to add the title; approximately 200 titles were added to this pick-list.

Justification – Page Number, Paragraph Number, Date, and Revision Number. These data fields represent the page number, paragraph number, date and revision number of the exact justification specified under the Technical Order data field. This data, along with all justification data, was specified on the Form 3952 or an attached copy of the relevant pages of the technical order. Approximately one-half of the justifications entered contained this data.

How Used. This data field is a large text box to be used to describe the material's purpose and how the material is used. PES found this data field not to be populated for all records. PES entered text for all authorizations for which it was included on the Form 3952. The majority of Form 3952s included some description of how the material was used.

Disposal. The disposal data field is a pick-list with several options for the anticipated method of disposing of the material, such as "Consumed in use", "Drummed/containerized", and "Recycled off-site". This data field was used primarily to describe the method of disposal for the material, not the material's

container. Information on container disposal was typed into the next Remarks data field.

Remarks (located under Environmental Review Section of the AF-EMIS Authorization Record). This data field is a blank space that can be used for miscellaneous comments pertaining to the Environmental Review section of the Authorization record. This data field was used to describe methods of container disposal. Additional material disposal information was also included when the Disposal pick-list did not provide sufficient detail. Also, any information on why an authorization was deleted was included here, such as a NSN being replaced by a by a specific NSN (NSN is specified).

Date Next Action. The Date Next Action data field indicates the date of the next required action, typically authorization renewal. The date is one year after the latest signature date on the Form 3952. This data field was updated for approximately ten percent of the authorization records.

Next Action. This data field indicates the next action that should occur on the date listed in the Date Next Action data field. Renewal was chosen for all authorizations except one-time only issues. Since one-time only authorizations are good for one issue of a quantity of material, the next action was set to "Deletion". PES typically found this data field to be correct; only new authorizations required Next Action data updating.

A Remarks data field is included under this Environmental Review section. It was used to describe reasons material authorizations were deleted that were not included under the non-required Delete Reason data field. For instance, if a NSN had been replaced, the authorization for the old NSN included comments in this remarks field identifying the new NSN.

Health Review – Personal Protective Equipment. Personal Protective Equipment (PPE) was entered into this data field based on information taken from the control measures section of HMIS. This data field is available for entry/validation by clicking the "New" button located to the right of the PPE data field box. A pick-list includes most PPE that may be required; however, chemical splash goggles, silver shield gloves, long sleeved shirt, and dust mask were not included. The system administration module was used to add additional PPE to the pick-list. Upon upgrade to a newer version of AF-EMIS (Version 6.0 is due for release in August 1999), these PPE may need to be repopulated in the pick-list but they will remain in the Authorization records.

Since the PPE was based on HMIS/MSDS information, it was far more efficient to populate all PPE data fields for a single NSN at once. Because most authorizations had already been entered in AF-EMIS by the Logistics Group, it was possible to scroll through all authorizations for a single NSN and populate the PPE. The fastest method was to add one PPE to the first authorization of the NSN, scroll to the next authorization, click the "New" button, click the "OK" button, then scroll to the next record. When one PPE is entered for all authorizations for a given NSN at a time, AF-EMIS "remembers" the last PPE selected; therefore, the selected PPE already appears in the pick-list. Thus, simply clicking "OK" populated the field.

A Remarks data field is included under the PPE data field. It was used to note that no PPE was necessary or other circumstances that related to PPE.

8.0

FINAL AF-EMIS STATUS

This section summarizes the final overall status of AF-EMIS at McConnell AFB after completion of data entry. In addition, remaining data gaps and issues are discussed, including proposed resolutions.

At completion of the data entry on 7 May 1999, there were 1,503 different authorized HAZMATs identified in the Base AF-EMIS database with either a NSN or LPN; 825 were items with a NSN and 678 were locally purchased items that were identified with a LPN. Approximately 1,844 CAGE records were completely updated; this does not account for partially completed CAGE records or multiple CAGE records for material kits. Accounting for these two items resulted in approximately 2,052 CAGE records. The NSN and CAGE records were completed for all but 149 of these materials. PES could not populate the NSN and CAGE records for 138 of these materials because a MSDS could not be obtained. As discussed Section 3, some of these materials' CAGE codes may have been incorrectly assigned in the electronic inventory. Eleven materials required container size data to complete the NSN and CAGE records. There were 2,568 authorizations in the Base's AF-EMIS database when PES completed the data entry activities.

PES submitted a one megabyte Excel spreadsheet that lists each shop and their authorized HAZMATs. Notes were included for each HAZMAT on the spreadsheet. These notes indicated the status of the AF-EMIS record types with respect to each shop's authorized HAZMAT. Additional notes were included describing all deficiencies in AF-EMIS record types for each shop-specific authorized HAZMAT, such as the container size is needed or a MSDS is needed. Included in this spreadsheet was a master list of materials requiring a MSDS and/or shop input.

PES developed the spreadsheet to monitor and document its data entry progress. It was submitted to the Base to aid CE, BE, and LG personnel in filling the few data gaps that require information not available to PES during its onsite work. It also will be helpful in maintaining the database.